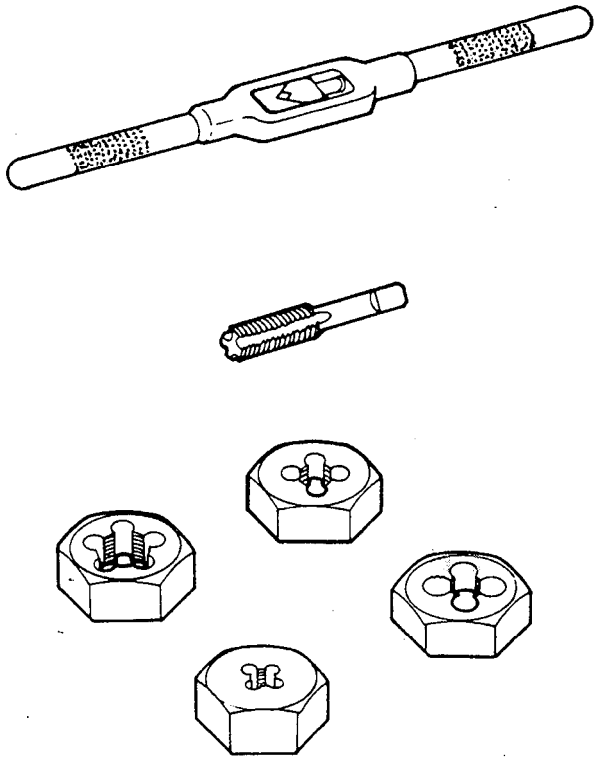
Chapter 38 TAPS AND DIES

HOW TO CHOOSE AND USE THEM

The “Types and Uses” section provides you with a list of some of the types of taps and dies. These pages should help you select the right taps and dies to do the job.

The ‘Using” section tells you how to use taps and dies to perform the desired functions. The “Care” procedures tell you how to care for the item.

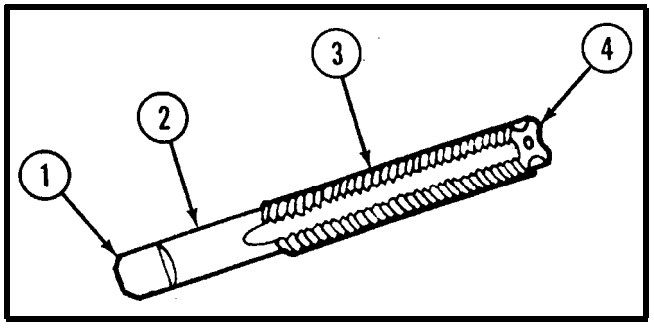


INDEX

TYPES AND USES

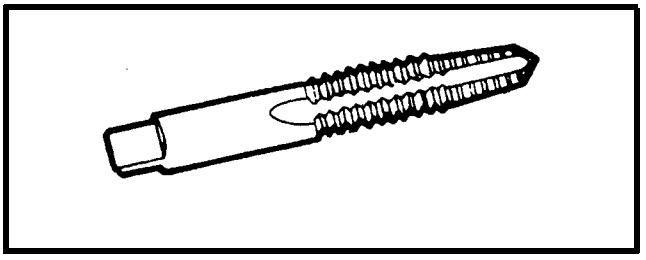
Taps and dies are used to cut threads in metal, plastics or hard rubber. The taps are used for cutting internal threads, and the dies are used to cut external threads.

TAPS



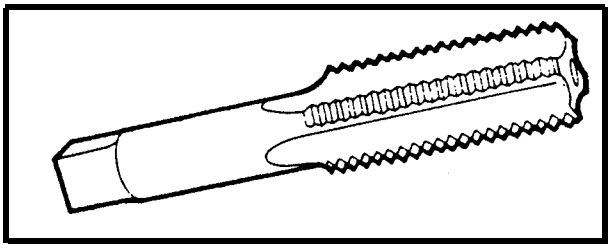
Taps are made of hardened steel and have the following parts: a square end (1) a round shank (2) a body (threaded) section (3) and a chamfer (4). The square end is used to turn the tap with either a straight or T-handled tap wrench. The shank is a smooth, rounded section which is immediately behind the threaded section. The body (threaded) section contains four flutes which have threads cut into their upper edges. They have a hollow section near the center to permit metal shavings to fall away from the cutting edges. The chamfer is the non-threaded end of the tap. It allows the tap to be positioned squarely in the metal to be threaded without engaging the threads of the tap.

TAPER (STARTING) HAND TAP



The taper (starting) hand tap has a chamfer (non-threaded) length equal to eight to ten threads. The taper hand tap is used to start tapping operations.

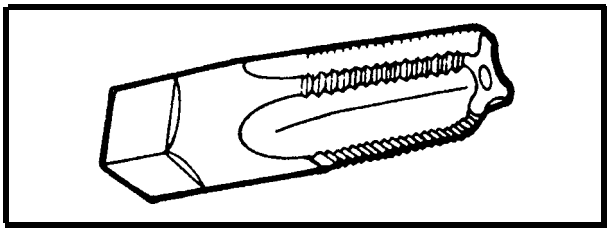
BOTTOMING HAND TAP



The bottoming hand tap has a chamfer length equal to one to one and one-half threads. This tap is used for threading the bottom of a blind hole only after the taper and plug taps have been used.

This tap is also used when tapping hard materials.

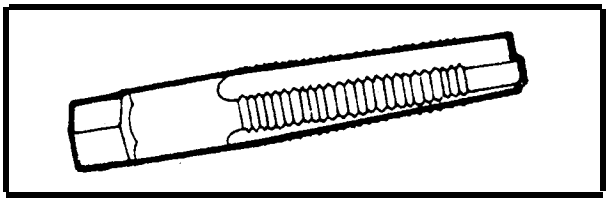
PLUG/PIPE HAND TAP



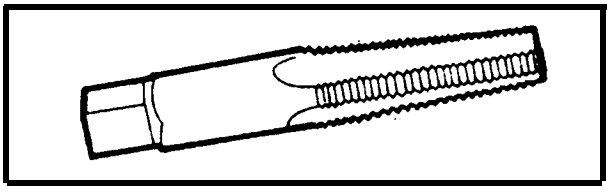
The pipe tap has a tapered diameterwhich increases at a rate of 3/4 inch per foot. All the threads on the pipe tap are designed to cut pipe. The pipe tap is used for cutting pipe fittings and in other places where extremely tight fits are required.

BOILER HAND TAPS

There are two types of boiler taps, straight and tapered.



Straight boiler taps range in size from 1/2 inch to 1-1/2 inches in diameter and have a chamfer for starting the tap.



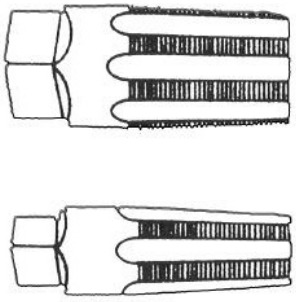
Tapered boiler taps have tapered diameters which increase at a rate of 3/4 inch per foot.

TYPES AND USES - Continued

STAYBOLT TAPS

Staybolt taps are used in boiler, locomotive, and railroad shops for tapping holes in the outer and inner plates or shells of boilers. The staybolt tap has two separate threaded areas. The first is for cutting threads and the second is for guiding the tap into another piece of metal for threading by the cutting threads. The spindle-type staybolt has an adjustable spindle which changes the distance between the cutting threads and the guide threads.

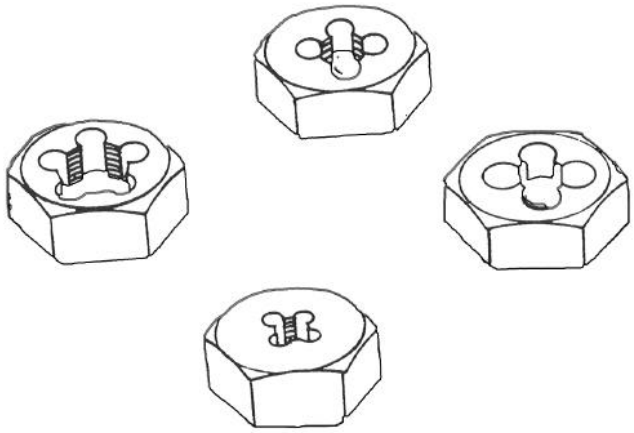
MUD HAND TAPS (WASHOUT TAP)



The mud or washout tap has six flutes, tapers 1-1/4 inch per foot, and has 12 threads per inch. It is used for cutting American National or V-form threadsin mud plug drain holes.

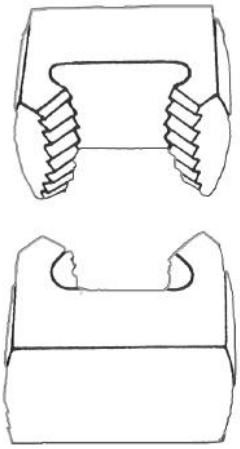
DIES

RETHREADING DIE



Rethreading dies are used to restore bruised (rounded) or rusty threads on screws and bolts. The rethreading die is hexagonal in shape and may be turned with a socket, box, open-end, or any other wrench that will fit. They are available in American Coarse and Fine Threads. Rethreading dies are available in a variety of sizes and are usually assembled in sets with a case.

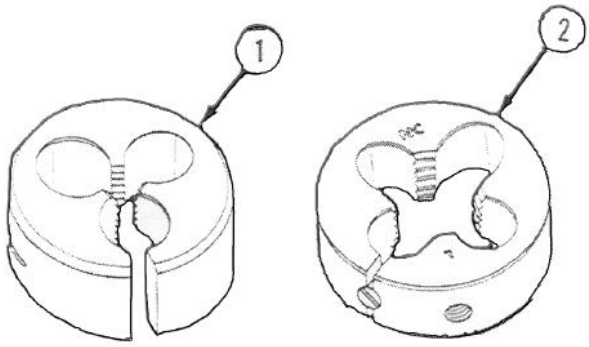
TWO-PIECE COLLET DIE



The two-piece collet die consists of the two die sections, the collet cap, and collet guide. The die sections are placed inside the cap and held in place by the guide. Adjustment of the die is done by turning setscrews on either end of the internal slot. They are used to cut American Standard Coarse and Fine Threads and are available in assorted sizes.

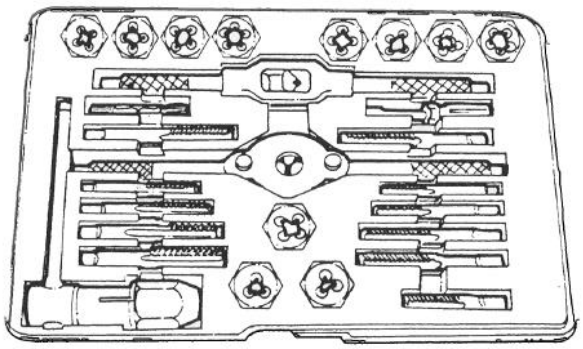
DIES - Continued

ROUND SPLIT ADJUSTABLE DIE



The round split adjustable die (1), or button die, may be adjusted through the screws on the holder. Adjustment on the open type is done by turning the three screws on the holder. One expands the die while the other two compress the die. Adjustment of the screw type (2) is done by turning a fine-pitch screw that either forces the die jaws apart or allows them to spring together. The round split adjustable dies are used to cut American Standard Coarse and Fine Threads. A die holder or handle is needed for proper operation of round split adjustable dies.

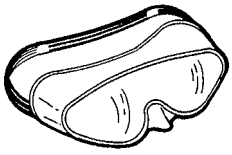
THREAD CUTTER SET



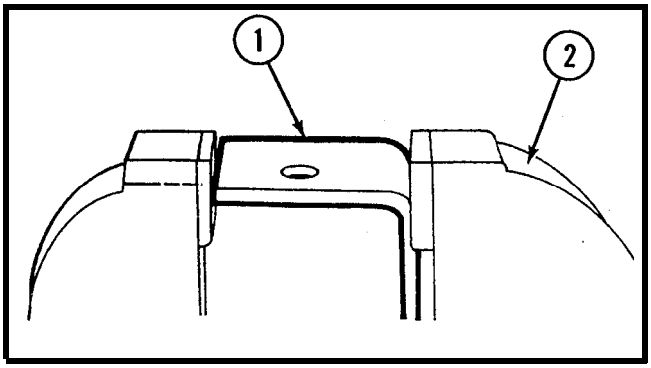
The thread cutter set is made up of a combination of taps, dies, diestocks, tap wrenches, guides, and screwdrivers and wrenches for making adjustments. Thread cutter sets are used for cutting internal and external threads.

USING A HAND TAP

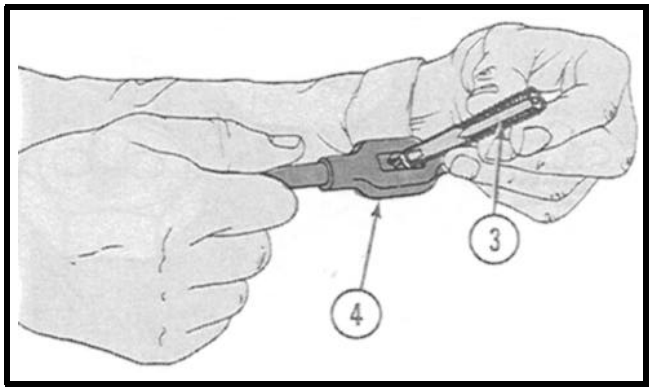
The following procedures may also be followed when using a taper tap or a bottoming hand tap.



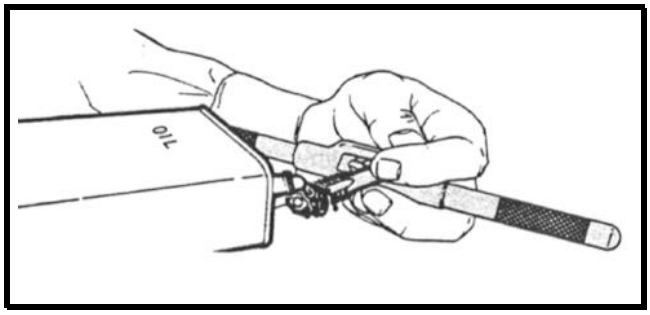
WARNING
WEAR EYE PROTECTION.



1 Clamp a steel plate (1) securely in a vise (2). Drill and ream a hole of desired size.

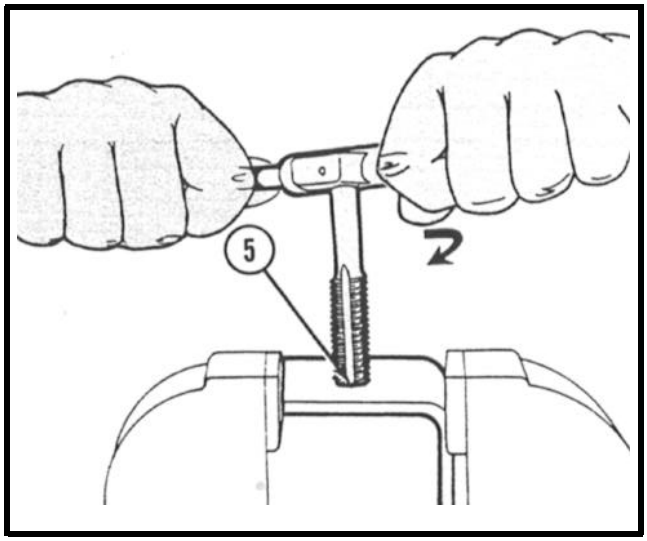


2 Select tap (3) and secure in tap wrench (4).

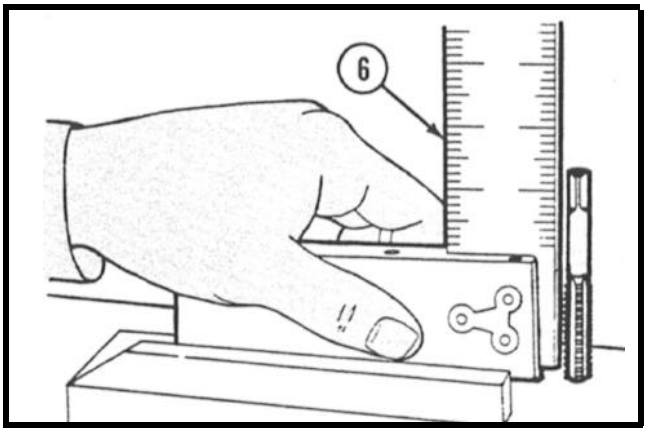


3 Apply cutting oil to the tap and the hole.

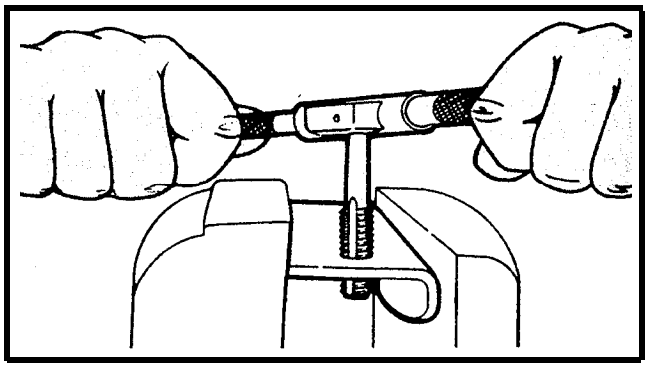
USING A HAND TAP - Continued



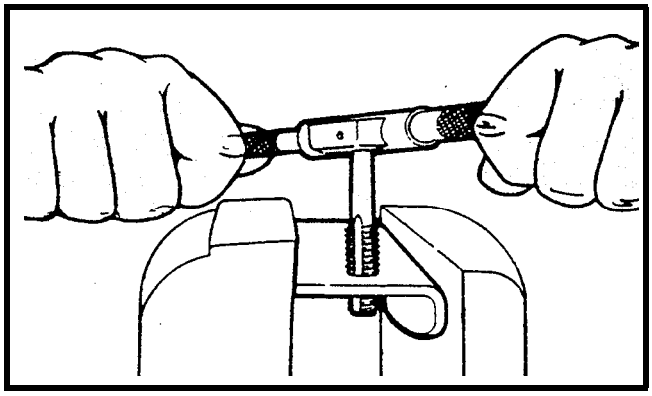
4 Place point of the tap in hole (5) and rotate clockwise for right-hand threads or rotate left-handed tap counterclockwise for left-hand threads.



5 Remove tap wrench and, using a square (6), check tap for squareness. Check at least two different positions on the tap.



6 Replace the tap wrench and continue tapping operation. It is not necessary to apply pressure, as the threads will be pulled through at all times.



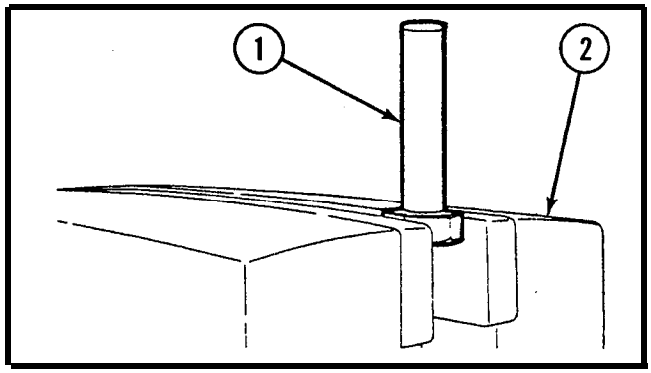
7 Remove tap by turning in the opposite direction. Wipe excess oil and metal shavings from metal plate. Check newly-cut threads with screw pitch gage before inserting screw or stud.

USING A DIE AND DIESTOCK

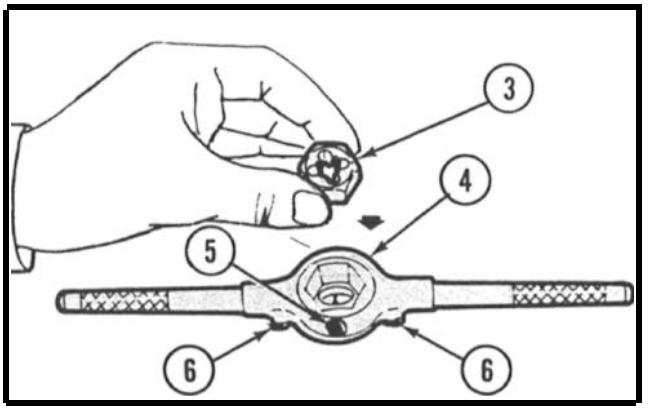
NOTE

Work to be threaded must be clean and free of burrs.

1 Secure the work (1) firmly in a vise (2).



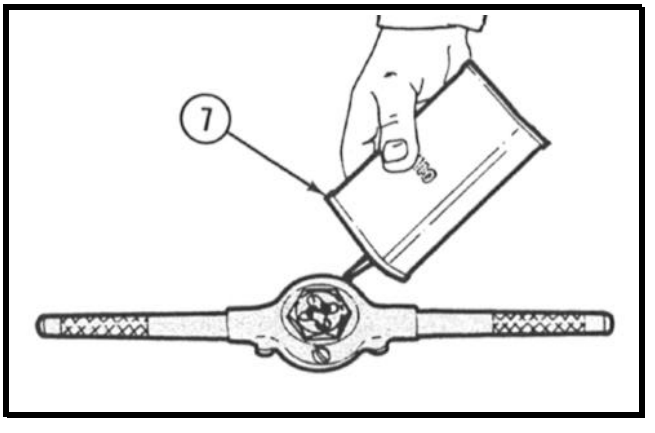
USING A DIE AND DIESTOCK - Continued



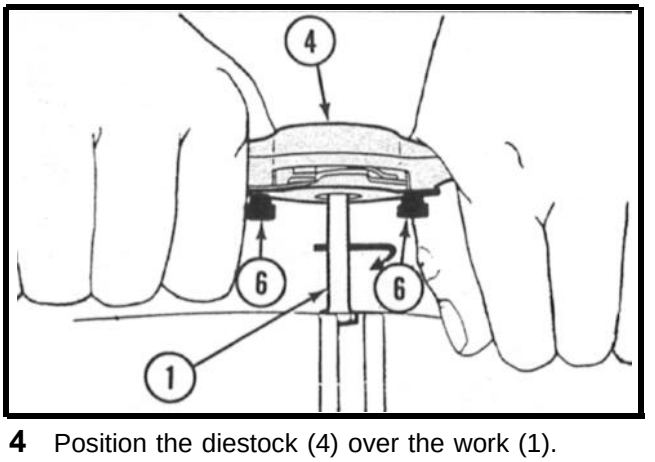
CAUTION

After assembling die to diestock, make sure setscrew is tight. Die could fall out of diestock causing damage to die.

2 Assemble die (3) and diestock (4). Tighten setscrew (5). Loosen the two thumbscrews (6) to adjust diestock (4).



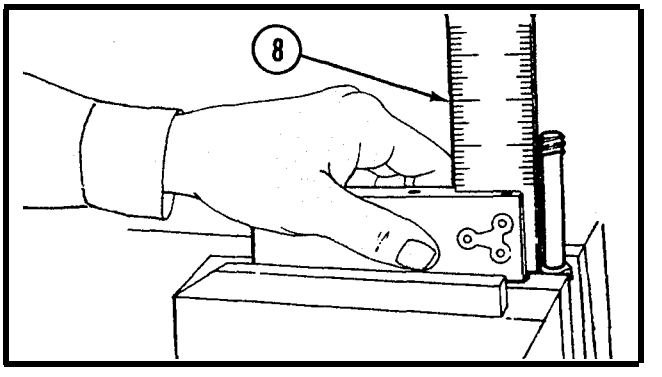
3 Apply cutting oil (7) to the die and to the work.



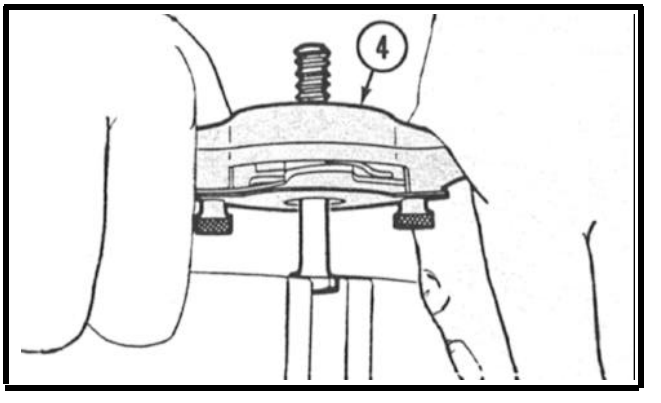
4 Position the diestock (4) over the work (1).

5 Tighten thumbscrews (6) securing diestock to work.

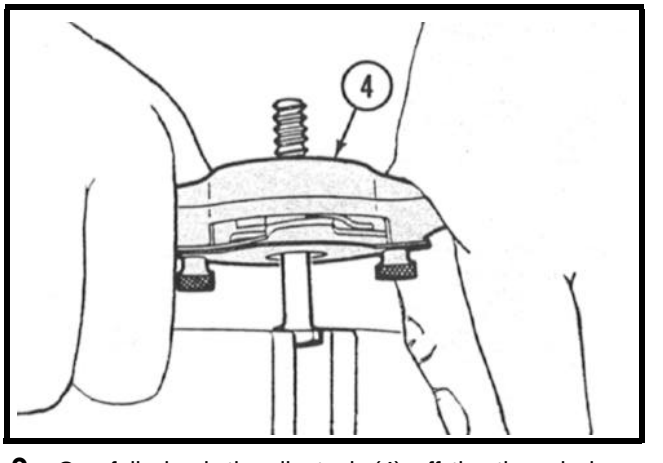
6 Rotate the diestock (4) clockwise, slowly but firmly, until the die takes hold.



7 Use square (8) to check squareness after several threads have been cut.

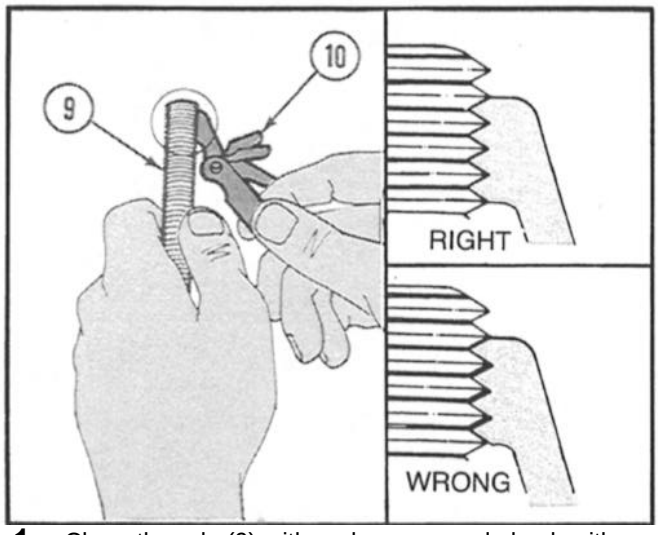


8 Turn the diestock (4) one turn forward and one-quarter turn backward. Repeat this procedure until desired thread length has been cut.

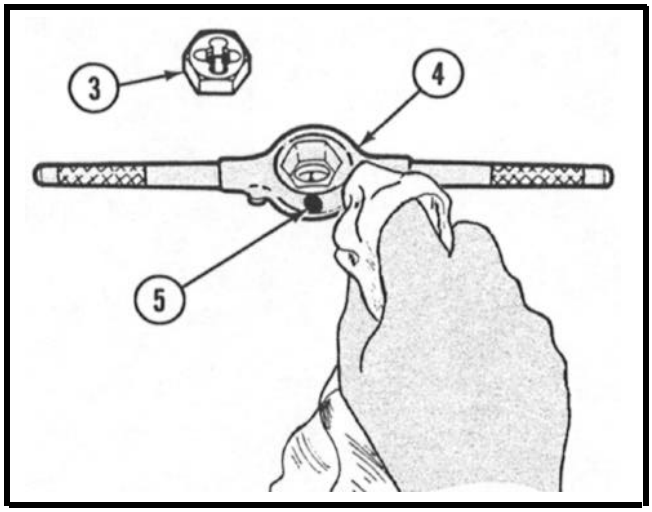


9 Carefully back the diestock (4) off the threads by turning in a counterclockwise direction.

USING A DIE AND DIESTOCK - Continued



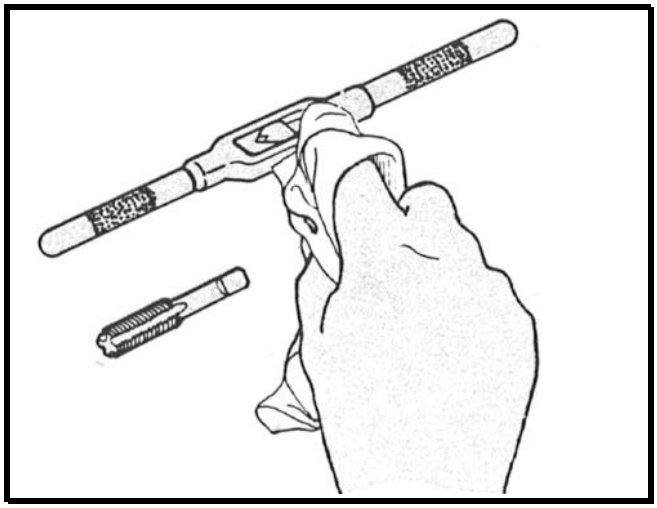
1 Clean threads (9) with a clean rag and check with a screw pitch gage (10) before using.



11 Disassemble die (3) and diestock (4) by loosening setscrew (5). Wipe clean with a rag.

CARE OF TAPS

1. Do not attempt to sharpen taps.
2. Keep cutting edges lightly oiled.
3. Wipe excess oil and metal shavings from tap and tapwrench.
4. Store them in a case or wrap individually in cloths to protect cutting surfaces.



CARE OF DIES

1. Do not attempt to sharpen dies.
2. Keep cutting surfaces clean and lightly lubricated.
3. Store in a case or wrap individually in cloths where they will not come in contact with other tools.